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Original Article

Physiotherapy Section

Reliability and Validity of Gujarati Version of Nomophobia Questionnaire: A Cross-sectional Study

NIYATI NILESHBHAI PATEL[1], DHWANIT S SHAH[2]

ABSTRACT

Introduction: Nomophobia is considered a modern-age phobia whereby individuals fear being without a smartphone. The present study focuses on translating the Nomophobia Questionnaire (NMP-Q) into Gujarati to measure nomophobia.

Aim: To assess the reliability and validity of the Gujarati version of the NMP-Q, aiming to enhance research, public health initiatives and clinical assessments.

Materials and Methods: This cross-sectional study was conducted from May 2023 to November 2023 at the Department of Physiotherapy, Vidhyadeep Institute of Physiotherapy, Surat, Gujarat, India and comprised two phases: 1) Face and content validation through expert clinical review; 2) Test-retest reliability. Face and content validity of the Gujarati NMP-Q were determined using the consensus method with a total of 200 participants aged between 15-18 years. To assess the reliability of the Gujarati NMP-Q, internal consistency and test-retest reliability were evaluated. Test-retest reliability was determined using the Intraclass Correlation Coefficient (ICC) and internal consistency was calculated using Cronbach's alpha.

Results: A total of 200 participants (mean age 17.60±1.40 years) were included in the study. The Gujarati version of the NMP-Q demonstrated excellent test-retest reliability, indicated by a high ICC (0.986) and high internal consistency (0.972). The values for Content Validation Ratio (CVR), Item-level Content Validation Index (I-CVI), Modified Kappa (K) and Proportion of Agreement were all 1.

Conclusion: The Gujarati version of the NMP-Q exhibits excellent reliability and good face and content validity. It is deemed adequate and valuable for assessing the level of fear of being without a smartphone in daily life among Gujarati-speaking school students.

Keywords: Content validation ratio, Gujarati version, Item-level content validation index, Test-retest reliability

INTRODUCTION

The web and cell phones are two instances of rapidly expanding technologies. One of the greatest innovations of the contemporary era is the cell phone. Most people in developed and non industrial countries use cell phones because of their comfort and simplicity of usage [1]. While the primary motivation behind cell phones was for individual conversations, current models offer a wide array of features, including Global Positioning System (GPS), high-quality cameras and music players. Despite the advancements in smartphone technology since its inception in 1983, improper use of a phone can still be detrimental to an individual's physical and mental well-being [2].

In response to behavioural issues related to phone use, cultural and legal restrictions have been implemented. Improper cell phone usage has been positively associated with aggression, smoking, suicidal thoughts and low self-esteem in individuals of all ages and genders. People's social lives and careers are thought to be significantly impacted by the pseudo-addictive behaviours associated with phones. Those who are addicted to cell phones often experience depression, loneliness and frustration when separated from their devices. Excessive calls, texts, internet browsing and online chats can disrupt both personal and professional life [2].

Excessive cell phone use is referred to as cell phone addiction, which is also a form of internet addiction. There is limited research on this topic. Evidence suggests that excessive cell phone use is linked to other psychological and social issues such as profound dependence, staying up late at night and excessive messaging. Some individuals even believe they would not be able to survive without their phones. Overuse of cell phones has a negative impact on students' mental and physical health [3].

The nervousness of being isolated from one's mobile phone and consequently missing calls is known as nomophobia. The shorthand for the feeling of dread towards not having a mobile phone is nomophobia. The term "nomophobia" was initially used in a recent report assessing cell phone users' fear [4]. Two different elements related to nomophobia are the nomophobic and the nomophobe. Individuals who have nomophobia are called nomophobes. An adjective used to describe the characteristics of nomophobes and the ways of behaving influenced by nomophobia is "nomophobic." Nomophobia has been studied as a modern world disorder that identifies the distress and/or anxiety caused by being cut-off from computers, smartphones and other communication devices [5]. While the initial definition focused on not being able to access computers, tablets, smartphones and other contemporary mass media technologies have now surpassed computers [4]. A study conducted in 2016 found that 68.92% of Indian smartphone users experienced nomophobia. Based on a cross-sectional experimental survey, this community observed that men were more likely than women to be dependent on their phones (82.91% versus 31.25%, respectively) [6]. Additionally, a recent study revealed that young adults between the ages of 18 and 24 years had a higher likelihood of experiencing nomophobia (77%) compared to those between the ages of 25 and 34 years (68%) [4]. The misuse of smartphones has been linked to long-term consequences such as altered behaviour and lifestyle, anxiety, Musculoskeletal Disorders (MSDs), low concentration, increased risk of brain cancers and parotid cancer, infertility, genetic mutations and other health symptoms [5]. Yildirim C and Correia AP collected self-reported NMP-Q to examine the various aspects of nomophobia in American students [7]. They also assessed the questionnaire's reliability and validity. The purpose of this two-stage study was to develop a self-report instrument that would indicate the severity of nomophobia among American students. The item count of the NMP-Q was then expanded based on the findings of the qualitative stage.

The NMP-Q is a 20-item questionnaire examining four categories of nomophobia: 1) communication failure (six items), 2) losing connectivity (five items), 3) inaccessibility to information (four items) and 4) inconvenience (five items). A seven-point Likert scale, ranging from strongly disagree (scoring 1) to strongly agree (scoring 7), is used to score each NMP-Q issue. Each domain and the full NMP-Q can have a total score, with higher summed values denoting more severe nomophobia [7].

The aim of the study was to translate and determine the reliability and validity of the Gujarati version of the NMPQ for use in Gujarat among Gujarati-speaking students. The objective was to translate the NMP-Q, examine face validity and content validity and assess test-retest reliability.

MATERIALS AND METHODS

The present cross-sectional study was conducted at the Department of Physiotherapy, Vidhyadeep Institute of Physiotherapy, Surat, Gujarat, India. from May 2023 to November 2023. Participants were selected from higher secondary school students at Vidhyadeep campus, Gujarat. The study sample consisted of 200 participants based on an item-to-subject ratio of 1:10 [8].

Inclusion criteria: Students who had smartphones volunteered to participate. Both males and females aged 15 to 18 years who can write and read Gujarati language were included in the study.

Exclusion criteria: Students who did not have smartphones were excluded from the study.

The NMP-Q original scale had open access with permission from the author and the study was conducted in four phases.

Study Procedure

Phase 1: Cultural adaptation and translation

The unique english NMP-Q was converted into Gujarati language by two freelance interpreters: one familiar with medical services and its terminology and the other unfamiliar with medical services and its terminology. After that, the two forward-interpreted versions were consolidated by two novice interpreters, resulting in target language variant 1. This rendition was then back-translated by a freelance back interpreter to confirm its consistency with the original version, resulting in target language variant 2.

Phase 2: Face and content validation

After the target language version 2 was provided to a team of seven clinical subject experts with an average experience of 10 years in the medical and educational fields, the consensus method was used to determine the face and content validity of the translated version. Each item of the questionnaire was reviewed by specialists for content, design, wording, relevance, scoring and organisational clarity. Each expert scored each aspect as either rejected, accepted, or accepted with modification. Following the examination and discussion, target language version 3 was developed. For content validation, all experts were asked to score each item of the questionnaire from 1 to 3, where 1 indicated "rejected," 2 indicated "accepted with modification," and 3 indicated "accepted" [9].

- CVR was calculated using below formula [10]

$$CVR=\frac{\{Ne-(N/2)\}}{N/2}$$

Where,

Ne=number of expert indicating "accepted"

N=total number of expert

CVR value more than 0.62 was approved [10]

- I-CVI was calculated using below formula [11]

I-CVI=Number of experts offering rating 3/Number of total experts

Interpretation of I-CVIs [10]

>79%-appropriate; 70-79%-needs revision; <70%- eliminated [12]

- Modified Kappa (K) for chance Agreement was calculated using below formula [10,11]

K=(I-CVI)-Pc/(1-Pc)

Where,

Probability of chance agreement (Pc) was calculated using below formula

$$Pc=\{N/A\ (N-A)\}*\ 0.5N$$

Here,

N=Number of experts in a panel

A=Number of experts who agree that the item is relevant

Interpretation of the K values [13]

>0.74: excellent; 0.60-0.74: good; 0.40-0.59: fair

- The proportion of agreement was calculated using the formula below [10,11].

The proportion of agreement=Number of experts who have identified questionnaire comprehensiveness favourably/Total number of experts.

Phase 3: Cognitive interview

Cognitive interviews were conducted by a free questioner. After obtaining written informed consent, the target language form 3 was provided to a sample of n=20 participants (aged 19-20 years). The interview was conducted to determine if the translation was correctly understood by the participants and whether the target language is clear and appropriate. Following the analysis and discussion, target language version 4 was created, which was further reviewed for editing and the final translated version was produced.

Phase 4: Reliability

A total of 200 participants were included to assess the reliability of the Gujarati NMP-Q. After obtaining informed consent, the final translated version of the NMP-Q was administered to the same participants for a second time by one administrator with a 24-hour gap. The ICC was calculated to determine test-retest reliability, while internal consistency was assessed using Cronbach's alpha.

In this context, an ICC value of less than 0.40 is considered fair, 0.40-0.59 is moderate, 0.60-0.79 is substantial and 0.80 or higher is excellent [14]. An ICC value of 0.986 is considered the maximum acceptable level of reliability [15]. The questionnaire can be found in [ANNEXURE 1].

STATISTICAL ANALYSIS

The data was analysed using Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics were presented as the mean and Standard Deviation (SD). Test-retest reliability was determined using ICC and internal consistency was calculated using Cronbach's alpha. The level of significance was set at $p<0.05$.

RESULTS

The total number of participants was 200, with 120 males and 80 females. The mean age of the students was 17.60±1.40 years.

Content and face validity: All seven experts accepted each item of the Gujarati NMP-Q. Therefore, the CVR value for each item of the Gujarati NMP-Q was 1, which is more than the suggested 0.62, indicating approval for each item [Table/Fig-1].

The I-CVI values for all items of the Gujarati NMP-Q were 1, suggesting that all items of the Gujarati NMP-Q were appropriate. The K qualities for all items of the Gujarati NMP-Q were 1. The extent of arrangement for all items of the Gujarati NMP-Q was 1 [Table/Fig-2]. In terms of face validity, 10 members were consulted to assess the understandability and simplicity of the items using a master survey methodology. According to their feedback, the Gujarati NMP-Q was considered basic and straightforward. All items of the Gujarati NMP-Q were deemed to have appropriate wording,

relevance, structure and ease of use by experts during the review process. The content of the translated items was clear, relevant and linked to the severity of the fear of being without a mobile phone, making them suitable for assessing the level of nomophobia.

Expert opinion about acceptence of items in Gujarati version of NMPS								No. of experts accepted contents (Ne)	CVR
Items	E1	E2	E3	E4	E5	E6	E7		
1	A	A	A	A	A	A	A	7	1
2	A	A	A	A	A	A	A	7	1
3	A	A	A	A	A	A	A	7	1
4	A	A	A	A	A	A	A	7	1
5	A	A	A	A	A	A	A	7	1
6	A	A	A	A	A	A	A	7	1
7	A	A	A	A	A	A	A	7	1
8	A	A	A	A	A	A	A	7	1
9	A	A	A	A	A	A	A	7	1
10	A	A	A	A	A	A	A	7	1
11	A	A	A	A	A	A	A	7	1
12	A	A	A	A	A	A	A	7	1
13	A	A	A	A	A	A	A	7	1
14	A	A	A	A	A	A	A	7	1
15	A	A	A	A	A	A	A	7	1
16	A	A	A	A	A	A	A	7	1
17	A	A	A	A	A	A	A	7	1
18	A	A	A	A	A	A	A	7	1
19	A	A	A	A	A	A	A	7	1
20	A	A	A	A	A	A	A	7	1

[Table/Fig-1]: Face and content validity.
Value of CVR for each item of Gujarati version of NMP-Q; E1, E2, E3 etc., suggest the number of expert member; A: accepted; CVR: Content validation ratio

Item no.	ICV-I	K	Interpretation	No. of experts agreed	Proportion of agreement
1	1	1	Excellent	7	1
2	1	1	Excellent	7	1
3	1	1	Excellent	7	1
4	1	1	Excellent	7	1
5	1	1	Excellent	7	1
6	1	1	Excellent	7	1
7	1	1	Excellent	7	1
8	1	1	Excellent	7	1
9	1	1	Excellent	7	1
10	1	1	Excellent	7	1
11	1	1	Excellent	7	1
12	1	1	Excellent	7	1
13	1	1	Excellent	7	1
14	1	1	Excellent	7	1
15	1	1	Excellent	7	1
16	1	1	Excellent	7	1
17	1	1	Excellent	7	1
18	1	1	Excellent	7	1
19	1	1	Excellent	7	1
20	1	1	Excellent	7	1

[Table/Fig-2]: Values of I-CVI, Modified kappa (K) and proportion of agreement for Items in Gujarati NMP-Q.
I-CVI: Item level content validity index

Reliability: The mean and SD of the total score of Gujarati NMP-Q at baseline and after 24 hours are shown in [Table/Fig-3]. The Gujarati NMP-Q showed excellent test-retest reliability, as evidenced by a high ICC (ICC=0.87, p=0.001) and high internal consistency (α=0.93).

Parameters	Mean±SD
Baseline	89.56±11.24
After 24 hours	90.16±11.11

[Table/Fig-3]: Comparison between Gujarati NMP-Q score at baseline and after 24 hrs.
Comparison between Gujarati NMP-Q score at baseline and after 24 hrs

The Gujarati NMP-Q demonstrates excellent reliability, as evidenced by its high test-retest reliability (ICC=0.986) and high internal consistency (α=0.97) [Table/Fig-4].

Analysis	Value
Intraclass correlation coefficient (ICC)	0.986
Cronbach's alpha	0.972

[Table/Fig-4]: ICC and Cronbach's alpha value.
ICC: Intraclass correlation coefficients

DISCUSSION

The NMP-Q is available in various language translations. The original English version has excellent reliability (0.93) and validity (α=0.91) [16]. NMP-Q is a self-administered scale. As the present study is part of a large research project to evaluate the effect of physiotherapy on nomophobia in adult participants from the Gujarat region, the Gujarati version of NMP-Q was validated by a team of experienced experts in various medical and educational fields. During the validation procedure, it was found that the Gujarati version of NMP-Q is a valid tool to measure the level of nomophobia in the Gujarati-speaking population.

Test-retest reliability and internal consistency of the Gujarati NMP-Q were similar to those of other translations [Table/Fig-5] [17-26].

Author	Publication year	Language	Population	Reliability	Interpretation
Adawi M et al., [17]	2018	Italian	Adults	0.95	Excellent
Al-Balhan EM et al., [18]	2018	Arabic	Adults	0.88	Excellent
Gutierrenz L al [19]	2016	Spanish	Adults	0.92	Excellent
Farchakh Y et al., [20]	2021	Arabic	Adults	0.95	Excellent
Galhardo A et al., [21]	2020	Portuguese	Adults	0.96	Excellent
Galhardo A et al., [22]	2022	Portuguese	Adolescents	0.95	Excellent
Gao Y et al., [23]	2020	Chinese	Adolescents and Adults	0.92	Excellent
González-Cabrera J et al., [24]	2017	Spanish	Adolescents	0.95	Excellent
Lee S et al., [25]	2018	English	Adults	0.95	Excellent
León-Mejía A et al., [26]	2021	Spanish	Adults	0.85	Excellent
Lin CY et al., [16]	2018	Persian	Adults	0.95	Excellent
Yildirim C and Correia AP [7]	2015	English	Adults	0.92	Excellent

[Table/Fig-5]: Value of ICC for various translations of NMP-Q Chronbach's alpha value [17-26].
ICC: Intraclass correlation coefficients

In other interpretation investigations of NMP-Q, the content approval proportion, I-CVI, adjusted kappa and extent of arrangement for

every item in the poll were not determined. However, in the current review, the CVR was determined to be 0.62, which is higher than its removed worth, indicating good endorsement of items in the poll. The authors also calculated the I-CVI, adjusted kappa and extent of agreement for each item in the poll and found adequate values for I-CVI, excellent K values for each item and 100% agreement on each item for thoroughness. It is challenging to establish reliability when there is a lack of content approval for any instrument. As content validity is crucial for various types of validity, a higher CVR provides a strong foundation for the measurements of different types of validity.

Limitation(s)

Limitations of the study include limited sample diversity that may affect the generalisability of the results, responses that may be biased due to self-reporting, cultural and linguistic nuances that may impact the accuracy of the translation and rapid changes in technology that may require updates to the questionnaire.

CONCLUSION(S)

The results indicate that the Gujarati NMP-Q is a reliable and valid scale to measure and evaluate the severity of nomophobia in the Gujarati-speaking population. The Gujarati version of the NMP-Q has excellent reliability and good face and content validity. It is adequate and useful for evaluating the level of fear of being without a smartphone in daily life among Gujarati-speaking school students.

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ANNEXURE 1:

Gujurati transalated version of the NOMOPHOBIA QUESTIONNAIRE

મને હાથ ધરાયેલ સંશોધન વિષે સમજાવવામાં આવેલ છે. જેમાં ભાગ લેવાની હું સંમતી આપુ છું. હું આ સંમતી કોઇપણ જાતના દબાણ વગર દર્શાવુ છું. હું ગમે ત્યારે કોઇપણ કારણ દર્શાવ્યા વગર તેમાંથી મુક્ત થઇ શકું છું અને તેની અસર મારી સારવાર પર નહીં થાય તેમ મને જાણ કરવામાં આવેલ છે. તે ઉપરાંત મારી ઓળખ કોઇપણ સંશોધનમાં છતી નહીં થાય.

STD: - _____ ROLL NO.- _____ AGE: _____ GENDER: BOY/GIRL DATE: _____
SIGNATURE:- _____

નોમોફોબિયા પ્રશ્નાવલી (એનએમપી-ક્યુ)

	પુરી રીતે અસંમત પુરી રીતે સંમત						
૧. મારા સ્માર્ટફોન દ્વારા માહિતીની સતત એક્સેસ (ઉપયોગ) વિના હું અસ્વસ્થતા અનુભવીશ.	1	2	3	4	5	6	7
૨. જ્યારે હું મારાસ્માર્ટ ફોન પર માહિતી જોવા માંગતો/માંગતી હોય અને ત્યારે હું તેને ન જોઇ શકું તો મને નારાજગી થશે.	1	2	3	4	5	6	7
૩. મારા સ્માર્ટ ફોન પર સમાચાર (ઉદાહરણ તરીકે: ઘટનાઓ, હવામાન, વગેરે) પ્રાપ્ત કરવામાં અસમર્થ થવાને લીધે હું ચિંતિત થઇશ.	1	2	3	4	5	6	7
૪.જ્યારે હું મારાસ્માર્ટ ફોન અને/અથવા તેની ક્ષમતાઓનો ઉપયોગ કરવા માંગતો/માંગતી હોય ત્યારે હું તે ન કરી શકું તો મને નારાજગી થશે.	1	2	3	4	5	6	7
૫. મારા સ્માર્ટફોન ની બેટરી ખતમ થવાથી મને ડર લાગશે.	1	2	3	4	5	6	7
૬. જો મારી ક્રેડિટ સમાપ્ત થઇ જશે અથવા મારી માસિક ડેટા મર્યાદા પહોંચી જશે, તો હું ગભરાઇશ.	1	2	3	4	5	6	7
૭. જો મારી પાસે ડેટા સિગ્નલ ન હોય અથવા વાઇ-ફાઇ સાથે સંપર્ક થઇ શકતો ન હોય, તો હું સતત તપાસ કરીશ કે મારી પાસે સિગ્નલ છે કે વાઇ-ફાઇ નેટવર્ક મળી શકે છે.	1	2	3	4	5	6	7
૮. જો હું મારા સ્માર્ટફોનનો ઉપયોગ ન કરી શકું તો મને ક્યાંક ફસાઇ જવાનો ડર લાગશે.	1	2	3	4	5	6	7
૯. જો હું મારાસ્માર્ટ ફોન ને થોડા સમય માટે ચેક ન કરી શકું, તો મને તેને ચેક કરવાની ઇચ્છા થશે.	1	2	3	4	5	6	7
૧૦. જો મારી પાસે મારોસ્માર્ટ ફોન ન હોત, તો હું બેચેન અનુભવીશ કારણકે હું મારા પરિવાર અને/અથવા મિત્રો સાથે તરત જ વાતચીત કરી શકીશ નહીં.	1	2	3	4	5	6	7
૧૧. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો હું ચિંતિત થઇશ કારણકે મારો પરિવાર અને/અથવા મિત્રો મારા સુધી પહોંચી શકશે નહીં.	1	2	3	4	5	6	7
૧૨. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો હું ચિંતા અનુભવીશ કારણકે હું ટેક્સ્ટ સંદેશાઓ અને કૉલ્સ પ્રાપ્ત કરી શકીશ નહીં.	1	2	3	4	5	6	7
૧૩. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો હું બેચેન થઇશ કારણ કે હું મારા પરિવાર અને/અથવા મિત્રો સાથે સંપર્કમાં રહી શકીશ નહીં.	1	2	3	4	5	6	7
૧૪. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો મેન ચિંતાનો અનુભવ થાત કારણ કે કોઇ એ મને સંપર્ક કરવાનો પ્રયાસ કર્યો હતો કે કેમ તે હું જાણી શકીશ નહીં.	1	2	3	4	5	6	7
૧૫. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો હું ચિંતા અનુભવીશ કારણકે મારા કુટુંબ અને મિત્રો સાથેનું મારું સતત જોડાણ તૂટી જશે.	1	2	3	4	5	6	7
૧૬. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો હું ચિંતા અનુભવીશ કારણકે હું મારી ઓનલાઇન ઓળખ થી ડિસ્કનેક્ટ(સંપર્ક ન થવો) થઇ જઇશ.	1	2	3	4	5	6	7
૧૭. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો હું અસ્વસ્થતા અનુભવીશ કારણકે હું સોશિયલમીડિયા અને ઓનલાઇન નેટવર્ક્સ સાથે અપ-ટૂ-ડેટ રહી શકીશ નહીં.	1	2	3	4	5	6	7
૧૮. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો મને અસ્વસ્થતાનો અનુભવ થાય કારણકે હું મારા કનેક્શન્સ(સંપર્ક) અને ઓનલાઇન નેટવર્ક્સ માંથી	1	2	3	4	5	6	7
અપડેટ્સ માટે મારી સૂચનાઓ તપાસ કરી શકીશ નહીં.							
૧૯. જો મારી પાસે મારોસ્માર્ટફોન ન હોત, તો હું ચિંતા/બેચેન અનુભવીશ કારણકે હું મારા ઇમેલ સંદેશા ઓ ચકાસી શકીશ નહીં.	1	2	3	4	5	6	7
૨૦. જો મારી પાસે મારો સ્માર્ટફોન ન હોત, તો મને અજીબ લાગશે કારણ કે મને ખબર નહીં પડે કે મારે શું કરવું.	1	2	3	4	5	6	7
Total score							